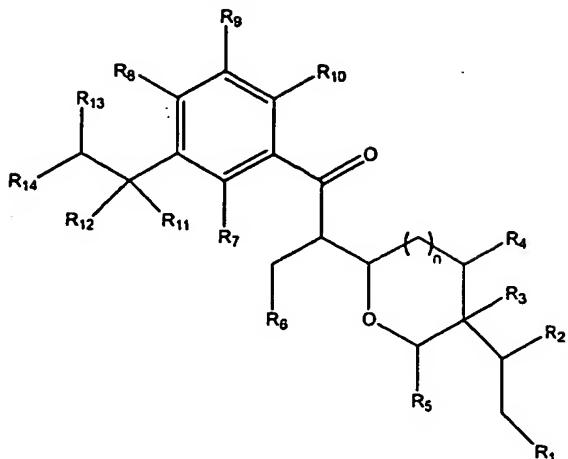


10/500424

DT04 Rec'd PCT/PTO 28 JUN 2004

Claims

1. A compound having the structure:



or pharmaceutically acceptable derivative thereof;

wherein n is 0, 1 or 2;

R₁ is hydrogen or an aliphatic, heteroaliphatic, aryl or heteroaryl moiety;

R₂ and R₃ are each independently hydrogen, or, when taken together, may be -O- or -(CH₂)_q- , wherein q is 1, 2 or 3;

R₄ is hydrogen, hydroxyl, protected hydroxyl or ORⁱ, or an aliphatic or heteroaliphatic moiety,

wherein Rⁱ is an aliphatic or heteroaliphatic moiety;

R₅ is hydrogen, hydroxyl, protected hydroxyl or ORⁱⁱ, or an aliphatic or heteroaliphatic moiety,

wherein Rⁱⁱ is an aliphatic or heteroaliphatic moiety, or wherein R₁ and R₅, when taken together, may form a cycloaliphatic or heterocycloaliphatic moiety comprising 6 to 12 atoms;

R₆ is hydrogen, or an aliphatic, heteroaliphatic, aryl or heteroaryl moiety;

R₇ is hydrogen, hydroxyl, protected hydroxyl, ORⁱⁱⁱ, or an aliphatic or heteroaliphatic moiety,

wherein Rⁱⁱⁱ is an aliphatic or heteroaliphatic moiety;

R₈ is hydrogen, hydroxyl, protected hydroxyl or OR^{iv},

wherein R^{iv} is an aliphatic or heteroaliphatic moiety;

R_9 is hydrogen, $-CF_3$, $-CHO$, imine, hydrazone, oxime, carboxylic acid, carboxylic ester, acyl halide, ketone, amide, acetal, anhydride, dihalide, epoxide, nitrile or an aliphatic or heteroaliphatic moiety;

R_{10} is hydroxyl or protected hydroxyl;

R_{11} and R_{12} are each independently hydrogen, hydroxyl or OR^v , or an aliphatic or heteroaliphatic moiety, or, when taken together, may be $-(C=O)-$;

wherein R^v is an aliphatic or heteroaliphatic moiety;

and R_{13} and R_{14} are each independently hydrogen, or an aliphatic, heteroaliphatic, aryl or heteroaryl moiety;

whereby each of the foregoing aliphatic and heteroaliphatic moieties may independently be substituted or unsubstituted, cyclic or acyclic, linear or branched, and whereby each of the foregoing aryl and heteroaryl moieties may be substituted or unsubstituted;

with the proviso that:

(a) when R_4 , R_5 , R_8 and R_{10} are each hydroxyl, R_7 is hydrogen, R_{13} and R_{14} are each methyl, R_2 and R_3 , taken together, form an epoxide, and n is 1, the following groups do not occur simultaneously as defined:

(i) R_1 is methyl, R_9 is hydrogen, (R_{11}, R_{12}) is $(=O)$ and R_6 is ethyl or isopropyl;

(ii) R_1 is methyl, R_9 is CHO , (R_{11}, R_{12}) is (OMe, H) and R_6 is ethyl, propyl or isopropyl;

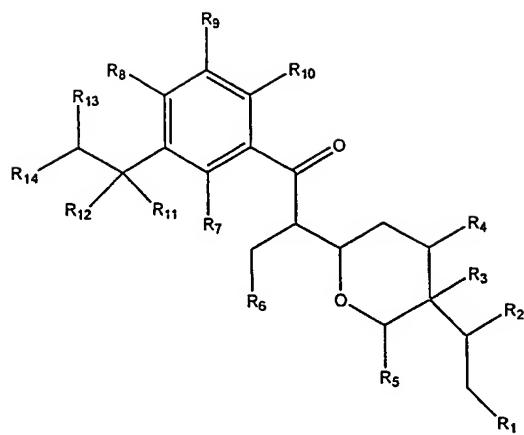
(iii) R_1 is methyl, R_9 is CHO , R_{11} and R_{12} are hydrogen and R_6 is ethyl, propyl or isopropyl;

(iv) R_1 is methyl, R_9 is $COCH_3$, R_{11} and R_{12} are hydrogen and R_6 is ethyl; and

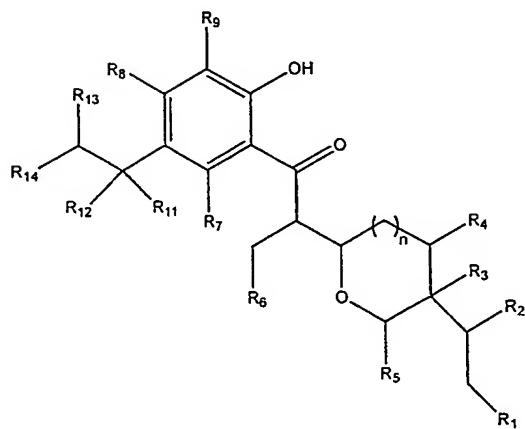
(v) R_1 is ethyl, R_9 is CHO , R_{11} and R_{12} are hydrogen and R_6 is ethyl; and

(b) when R_1 is methyl, R_2 and R_3 , taken together, form an epoxide, R_6 is ethyl, R_7 is hydrogen, (R_{11}, R_{12}) is (OMe, H) , R_{13} and R_{14} are each methyl and n is 1, the following groups do not occur simultaneously as defined: R_4 and R_5 is OH or OBn , R_8 and R_{10} is OH or $-OCH_2OCH_3$ and R_9 is $-CHO$, $-CH_2OH$ or $-CH_2OTBS$.

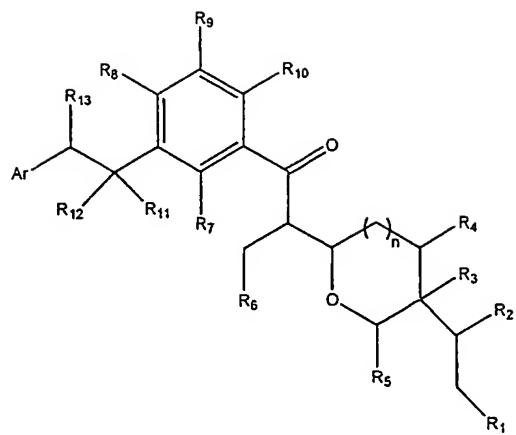
2. The compound of claim 1 wherein n is 1 and the compound has the structure:



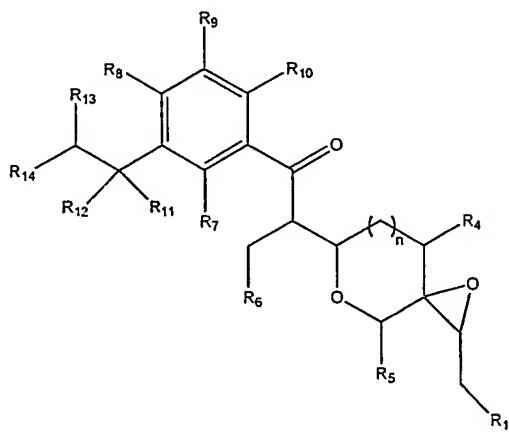
3. The compound of claim 1 wherein R₁₀ is hydroxyl and the compound has the structure:



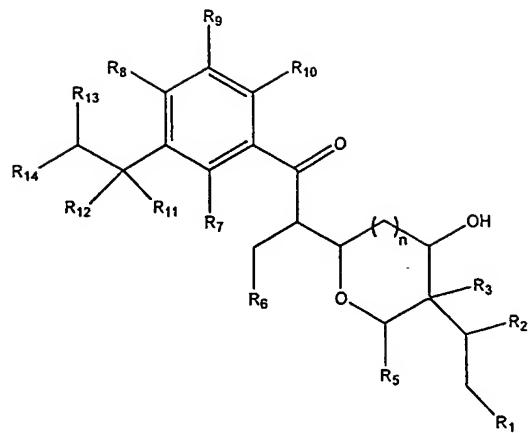
4. The compound of claim 1 wherein R₁₄ is aryl and the compound has the structure:



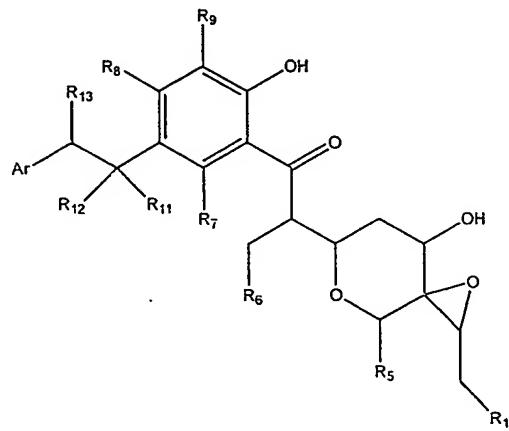
5. The compound of claim 1 wherein R₂ and R₃, taken together, form an epoxide and the compound has the structure:



6. The compound of claim 1 wherein R₄ is hydroxyl and the compound has the structure:



7. The compound of claim 1 wherein R₂ and R₃, taken together, form an epoxide, R₄ and R₁₀ are each hydroxyl, R₁₄ is aryl, n is 1 and the compound has the structure:



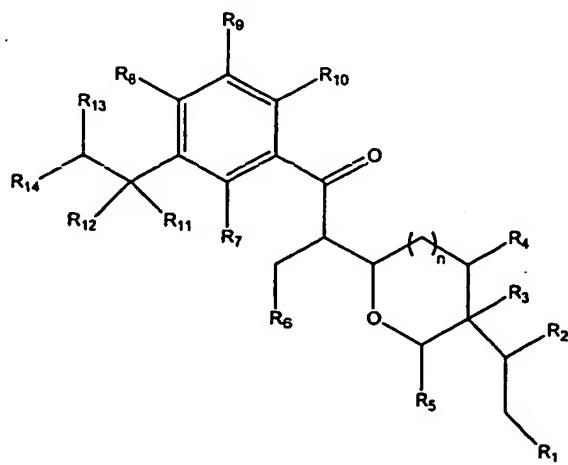
8. The compound of any one of claims 1, 2, 3, 4, 5, 6 or 7 wherein R₁ is hydrogen or lower alkyl, and wherein the alkyl substituent may be substituted or unsubstituted, linear or branched or cyclic or acyclic.

9. The compound of any one of claims 1, 2, 3, 4 or 6 wherein R₂ and R₃, taken together, form a cyclopropyl moiety.

10. The compound of any one of claims 1, 2, 3, 4 or 6 wherein R₂ and R₃, taken together, form an epoxide.
11. The compound of any one of claims 1, 2, 3, 4 or 5 wherein R₄ is hydroxyl.
12. The compound of any one of claims 1, 2, 3, 4, 5, 6 or 7 wherein R₅ is hydroxyl or lower alkoxy, and wherein the alkoxy substituent may be substituted or unsubstituted, linear or branched or cyclic or acyclic.
13. The compound of any one of claims 1, 2, 3, 4, 5, 6 or 7 wherein R₆ is lower alkyl, and wherein the alkyl substituent may be substituted or unsubstituted, linear or branched or cyclic or acyclic.
14. The compound of any one of claims 1, 2, 3, 4, 5, 6 or 7 wherein R₇ is hydrogen, hydroxyl, lower alkyl or lower alkoxy, and wherein the alkyl and alkoxy substitutents may be substituted or unsubstituted, linear or branched or cyclic or acyclic.
15. The compound of any one of claims 1, 2, 3, 4, 5, 6 or 7 wherein R₈ is hydrogen, hydroxyl or protected hydroxyl.
16. The compound of any one of claims 1, 2, 3, 4, 5, 6 or 7 wherein R₉ is -CHO or -CH₂OR^{vi}, wherein R^{vi} is hydrogen, protecting group or an aliphatic moiety, and wherein the aliphatic moiety may be substituted or unsubstituted, linear or branched or cyclic or acyclic.
17. The compound of any one of claims 1, 2, 4, 5 or 6 wherein R₁₀ is hydroxyl.
18. The compound of any one of claims 1, 2, 3, 4, 5, 6 or 7 wherein R₁₁ and R₁₂ are independently hydrogen or lower alkoxy, and wherein the alkoxy substituent may be substituted or unsubstituted, branched or unbranched or cyclic or acyclic.
19. The compound of any one of claims 1, 2, 3, 5 or 6 wherein R₁₃ and R₁₄ are independently hydrogen, lower alkyl or aryl, wherein the alkyl substituent may be

substituted or unsubstituted, branched or unbranched or cyclic or acyclic, and wherein the aryl substituent may be substituted or unsubstituted.

20. The compound of claim 4 or 7 wherein R₁₃ is lower alkyl, and wherein the alkyl substituent may be substituted or unsubstituted, linear or branched or cyclic or acyclic.
21. The compound of claim 7 wherein R₁ is hydrogen or lower alkyl, R₅ is hydroxyl or lower alkoxy, R₆ is lower alkyl, R₇ is hydrogen, hydroxyl, lower alkyl or lower alkoxy, R₈ is hydrogen, hydroxyl or protected hydroxyl, R₉ is -CHO or -CH₂OR^{vi}, R₁₁ and R₁₂ are independently hydrogen or lower alkoxy, and R₁₃ is lower alkyl; wherein R^{vi} is hydrogen, protecting group or an aliphatic or heteroaliphatic moiety; whereby each of the foregoing alkyl, alkoxy, aliphatic and heteroaliphatic moieties may be independently substituted or unsubstituted, linear or branched, or cyclic or acyclic.
22. A pharmaceutical composition comprising:
a compound having the structure:



or pharmaceutically acceptable derivative thereof; and
a pharmaceutically acceptable carrier;
wherein n is 0, 1 or 2;
R₁ is hydrogen or an aliphatic, heteroaliphatic, aryl or heteroaryl moiety;

R₂ and R₃ are each independently hydrogen, or, when taken together, may be -O- or -(CH₂)_q- , where q is 1, 2 or 3;

R₄ is hydrogen, hydroxyl, protected hydroxyl or ORⁱ, or an aliphatic or heteroaliphatic moiety,

wherein Rⁱ is an aliphatic or heteroaliphatic moiety;

R₅ is hydrogen, hydroxyl, protected hydroxyl or ORⁱⁱ, or an aliphatic or heteroaliphatic moiety,

wherein Rⁱⁱ is an aliphatic or heteroaliphatic moiety, or wherein R₁ and R₅, when taken together, may form a cycloaliphatic or heterocycloaliphatic moiety comprising 6 to 12 atoms;

R₆ is hydrogen, or an aliphatic, heteroaliphatic, aryl or heteroaryl moiety;

R₇ is hydrogen, hydroxyl, protected hydroxyl, ORⁱⁱⁱ, or an aliphatic or heteroaliphatic moiety,

wherein Rⁱⁱⁱ is an aliphatic or heteroaliphatic moiety;

R₈ is hydrogen, hydroxyl, protected hydroxyl or OR^{iv},

wherein R^{iv} is an aliphatic or heteroaliphatic moiety;

R₉ is hydrogen, -CF₃, -CHO, imine, hydrazone, oxime, carboxylic acid, carboxylic ester, acyl halide, ketone, amide, acetal, anhydride, dihalide, epoxide, nitrile or an aliphatic or heteroaliphatic moiety;

R₁₀ is hydroxyl or protected hydroxyl;

R₁₁ and R₁₂ are each independently hydrogen, hydroxyl or OR^v, or an aliphatic or heteroaliphatic moiety, or, when taken together, may be -(C=O)-;

wherein R^v is an aliphatic or heteroaliphatic moiety;

and R₁₃ and R₁₄ are each independently hydrogen, or an aliphatic, heteroaliphatic, aryl or heteroaryl moiety; and

pharmaceutically acceptable derivatives thereof;

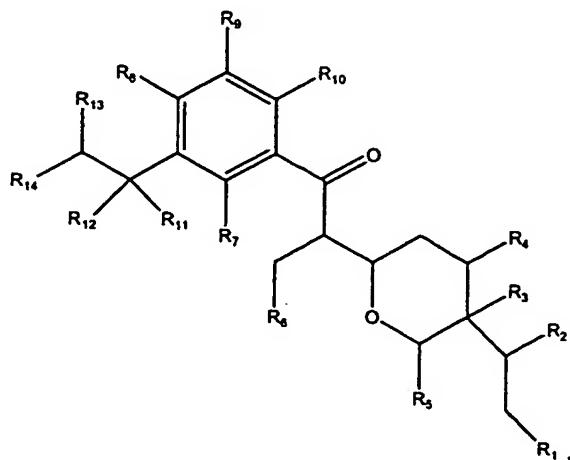
whereby each of the foregoing aliphatic and heteroaliphatic moieties may independently be substituted or unsubstituted, cyclic or acyclic, linear or branched, and whereby each of the foregoing aryl and heteroaryl moieties may be substituted or unsubstituted;

with the proviso that when R₄, R₅, R₈ and R₁₀ are each hydroxyl, R₇ is hydrogen, R₁₃ and R₁₄ are each methyl, R₂ and R₃, taken together, form an epoxide, and n is 1, the following groups do not occur simultaneously as defined:

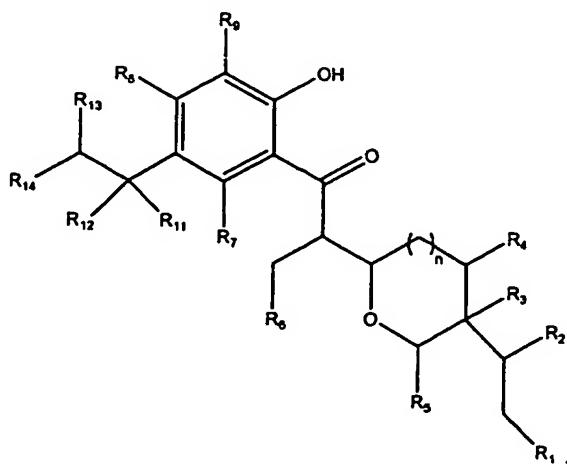
(i) R₁ is methyl, R₉ is hydrogen, (R₁₁, R₁₂) is (=O) and R₆ is ethyl or isopropyl;

- (ii) R₁ is methyl, R₉ is CHO, (R₁₁, R₁₂) is (OMe, H) and R₆ is ethyl, propyl or isopropyl;
- (iii) R₁ is methyl, R₉ is CHO, R₁₁ and R₁₂ are hydrogen and R₆ is ethyl, propyl or isopropyl;
- (iv) R₁ is methyl, R₉ is COCH₃, R₁₁ and R₁₂ are hydrogen and R₆ is ethyl; and
- (v) R₁ is ethyl, R₉ is CHO, R₁₁ and R₁₂ are hydrogen and R₆ is ethyl.

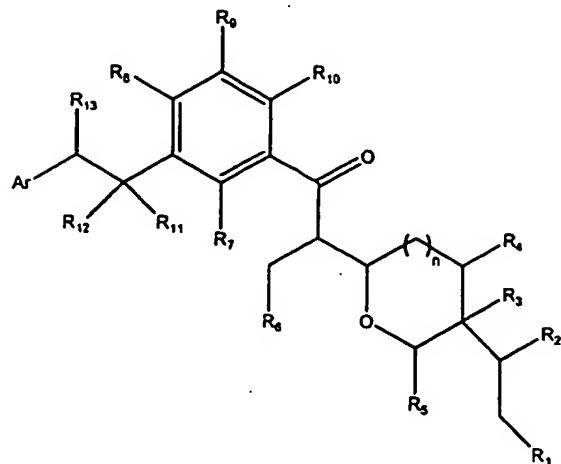
23. The pharmaceutical composition of claim 22 wherein n is 1 and the compound has the structure:



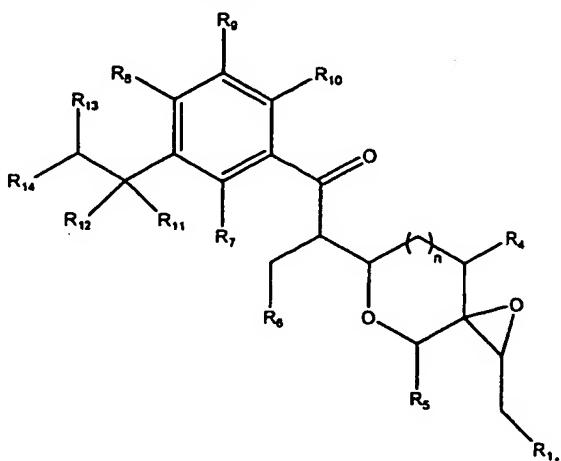
24. The pharmaceutical composition of claim 22 wherein R₁₀ is hydroxyl and the compound has the structure:



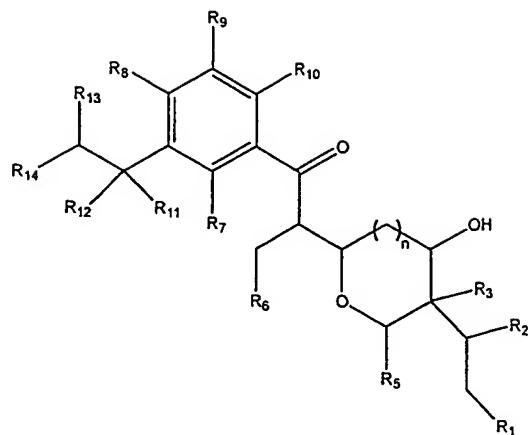
25. The pharmaceutical composition of claim 22 wherein R₁₄ is aryl and the compound has the structure:



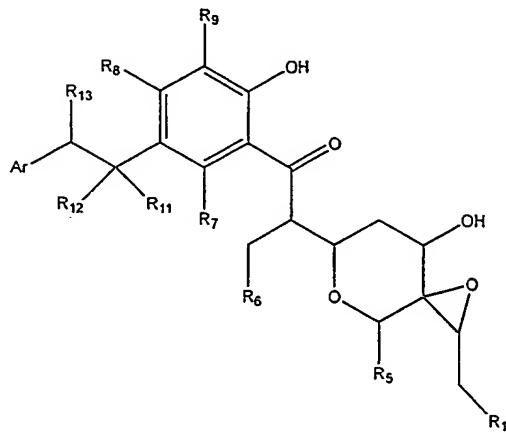
26. The pharmaceutical composition of claim 22 wherein R₂ and R₃, taken together, form an epoxide, and the compound has the structure:



27. The pharmaceutical composition of claim 22 wherein R₄ is hydroxyl and the compound has the structure:



28. The pharmaceutical composition of claim 22 wherein R₂ and R₃, taken together, form an epoxide, R₄ and R₁₀ are each hydroxyl, R₁₄ is aryl, n is 1 and the compound has the structure:



29. The pharmaceutical composition of any one of claims 22, 23, 24, 25, 26, 27 or 28 wherein R₁ is hydrogen or lower alkyl, and wherein the alkyl substituent may be substituted or unsubstituted, linear or branched or cyclic or acyclic.

30. The pharmaceutical composition of any one of claims 22, 23, 24, 25 or 27 wherein R₂ and R₃, taken together, form a cyclopropyl moiety.

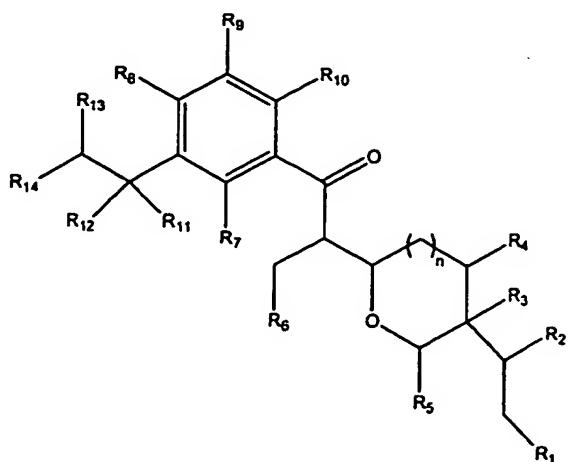
31. The pharmaceutical composition of any one of claims 22, 23, 24, 25 or 27 wherein R₂ and R₃, taken together, form an epoxide.
32. The pharmaceutical composition of any one of claims 22, 23, 24, 25 or 26 wherein R₄ is hydroxyl.
33. The pharmaceutical composition of any one of claims 22, 23, 24, 25, 26, 27 or 28 wherein R₅ is hydroxyl or lower alkoxy, and wherein the alkoxy substituent may be substituted or unsubstituted, linear or branched or cyclic or acyclic.
34. The pharmaceutical composition of any one of claims 22, 23, 24, 25, 26, 27 or 28 wherein R₆ is lower alkyl, and wherein the alkyl substituent may be substituted or unsubstituted, linear or branched or cyclic or acyclic.
35. The pharmaceutical composition of any one of claims 22, 23, 24, 25, 26, 27 or 28 wherein R₇ is hydrogen, hydroxyl, lower alkyl or lower alkoxy, and wherein the alkyl and alkoxy substituents may be substituted or unsubstituted, linear or branched or cyclic or acyclic.
36. The pharmaceutical composition of any one of claims 22, 23, 24, 25, 26, 27 or 28 wherein R₈ is hydrogen, hydroxyl or protected hydroxyl.
37. The pharmaceutical composition of any one of claims 22, 23, 24, 25, 26, 27 or 28 wherein R₉ is -CHO or -CH₂OR^{vi}, wherein R^{vi} is hydrogen, protecting group or an aliphatic moiety, and wherein the aliphatic moiety may be substituted or unsubstituted, linear or branched or cyclic or acyclic.
38. The pharmaceutical composition of any one of claims 22, 23, 25, 26 or 27 wherein R₁₀ is hydroxyl.
39. The pharmaceutical composition of any one of claims 22, 23, 24, 25, 26, 27 or 28 wherein R₁₁ and R₁₂ are independently hydrogen or lower alkoxy, and wherein the alkoxy substituent may be substituted or unsubstituted, branched or unbranched or cyclic or acyclic.

40. The pharmaceutical composition of any one of claims 22, 23, 24, 26 or 27 wherein R₁₃ and R₁₄ are independently hydrogen, lower alkyl or aryl, wherein the alkyl substituent may be substituted or unsubstituted, branched or unbranched or cyclic or acyclic, and wherein the aryl substituent may be substituted or unsubstituted.

41. The pharmaceutical composition of claim 25 or 28 wherein R₁₃ is lower alkyl, and wherein the alkyl substituent may be substituted or unsubstituted, linear or branched or cyclic or acyclic.

42. The pharmaceutical composition of claim 28 wherein R₁ is hydrogen or lower alkyl, R₅ is hydroxyl or lower alkoxy, R₆ is lower alkyl, R₇ is hydrogen, hydroxyl, lower alkyl or lower alkoxy, R₈ is hydrogen, hydroxyl or protected hydroxyl, R₉ is -CHO or -CH₂OR^{vi}, R₁₁ and R₁₂ are independently hydrogen or lower alkoxy, and R₁₃ is lower alkyl; wherein R^{vi} is hydrogen, protecting group or an aliphatic or heteroaliphatic moiety;
whereby each of the foregoing alkyl, alkoxy, aliphatic and heteroaliphatic moieties may be independently substituted or unsubstituted, linear or branched, or cyclic or acyclic.

43. A method for treating cancer comprising:
administering to a subject in need thereof a therapeutically effective amount of a compound having the structure:



or pharmaceutically acceptable derivative thereof;

wherein n is 0, 1 or 2;

R₁ is hydrogen or an aliphatic, heteroaliphatic, aryl or heteroaryl moiety;

R₂ and R₃ are each independently hydrogen, or, when taken together, may be -O- or -(CH₂)_q- , where q is 1, 2 or 3;

R₄ is hydrogen, hydroxyl, protected hydroxyl or ORⁱ, or an aliphatic or heteroaliphatic moiety,

wherein Rⁱ is an aliphatic or heteroaliphatic moiety;

R₅ is hydrogen, hydroxyl, protected hydroxyl or ORⁱⁱ, or an aliphatic or heteroaliphatic moiety,

wherein Rⁱⁱ is an aliphatic or heteroaliphatic moiety, or wherein R₁ and R₅, when taken together, may form a cycloaliphatic or heterocycloaliphatic moiety comprising 6 to 12 atoms;

R₆ is hydrogen, or an aliphatic, heteroaliphatic, aryl or heteroaryl moiety;

R₇ is hydrogen, hydroxyl, protected hydroxyl, ORⁱⁱⁱ, or an aliphatic or heteroaliphatic moiety,

wherein Rⁱⁱⁱ is an aliphatic or heteroaliphatic moiety;

R₈ is hydrogen, hydroxyl, protected hydroxyl or OR^{iv},

wherein R^{iv} is an aliphatic or heteroaliphatic moiety;

R₉ is hydrogen, -CF₃, -CHO, imine, hydrazone, oxime, carboxylic acid, carboxylic ester, acyl halide, ketone, amide, acetal, anhydride, dihalide, epoxide, nitrile or an aliphatic or heteroaliphatic moiety;

R₁₀ is hydroxyl or protected hydroxyl;

R₁₁ and R₁₂ are each independently hydrogen, hydroxyl or OR^v, or an aliphatic or heteroaliphatic moiety, or, when taken together, may be -(C=O)-;

wherein R^v is an aliphatic or heteroaliphatic moiety;

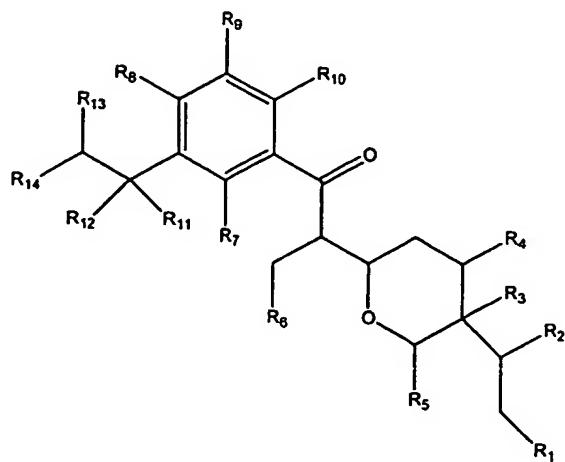
and R₁₃ and R₁₄ are each independently hydrogen, or an aliphatic, heteroaliphatic, aryl or heteroaryl moiety;

whereby each of the foregoing aliphatic and heteroaliphatic moieties may independently be substituted or unsubstituted, cyclic or acyclic, linear or branched, and whereby each of the foregoing aryl and heteroaryl moieties may be substituted or unsubstituted;

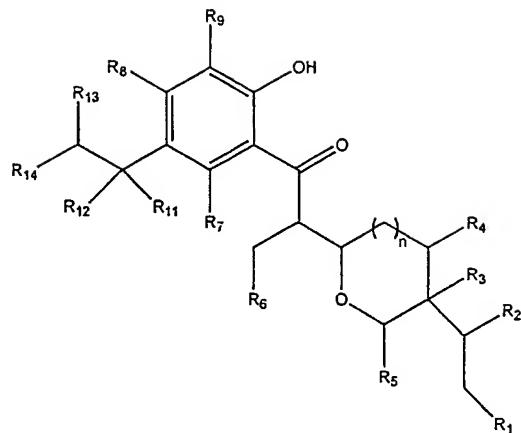
with the proviso that when R₄, R₅, R₈ and R₁₀ are each hydroxyl, R₇ is hydrogen, R₁₃ and R₁₄ are each methyl, R₂ and R₃, taken together, form an epoxide, and n is 1, the following groups do not occur simultaneously as defined:

- (i) R₁ is methyl, R₉ is hydrogen, (R₁₁, R₁₂) is (=O) and R₆ is ethyl or isopropyl;
- (ii) R₁ is methyl, R₉ is CHO, (R₁₁, R₁₂) is (OMe, H) and R₆ is ethyl, propyl or isopropyl;
- (iii) R₁ is methyl, R₉ is CHO, R₁₁ and R₁₂ are hydrogen and R₆ is ethyl, propyl or isopropyl;
- (iv) R₁ is methyl, R₉ is COCH₃, R₁₁ and R₁₂ are hydrogen and R₆ is ethyl; and
- (v) R₁ is ethyl, R₉ is CHO, R₁₁ and R₁₂ are hydrogen and R₆ is ethyl.

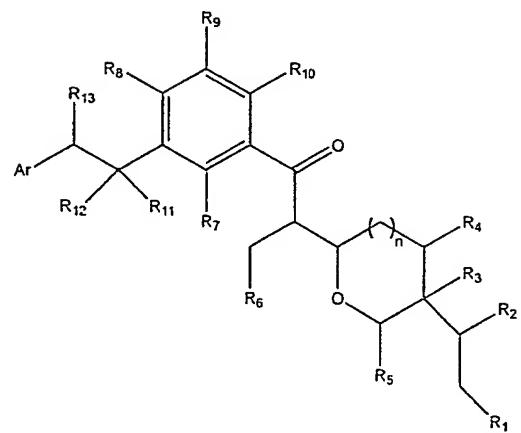
45. The method of claim 43 wherein in the compound n is 1 and the compound has the structure:



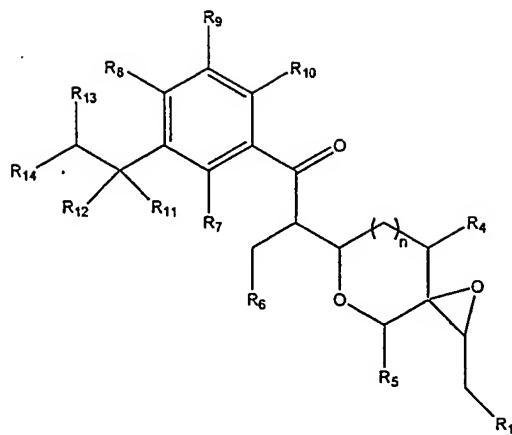
46. The method of claim 43 wherein in the compound R₁₀ is hydroxyl and the compound has the structure:



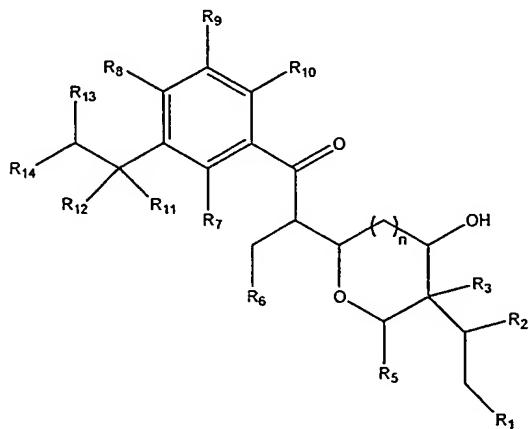
47. The method of claim 43 wherein in the compound R₁₄ is aryl and the compound has the structure:



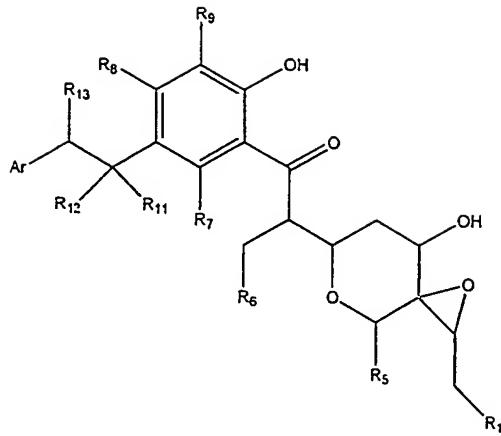
48. The method of claim 43 wherein in the compound R₂ and R₃, taken together, form an epoxide and the compound has the structure:



49. The method of claim 43 wherein in the compound R₄ is hydroxyl and the compound has the structure:



50. The method of claim 43 wherein in the compound R₂ and R₃, taken together, form an epoxide, R₄ and R₁₀ are each hydroxyl, R₁₄ is aryl, n is 1 and the compound has the structure:



51. The method of any one of claims 43, 44, 45, 46, 47, 48, 49 or 50 wherein in the compound R_1 is hydrogen or lower alkyl, and wherein the alkyl substituent may be substituted or unsubstituted, linear or branched or cyclic or acyclic.
52. The method of any one of claims 43, 44, 45, 46, 47 or 49 wherein in the compound R_2 and R_3 , taken together, form a cyclopropyl moiety.
53. The method of any one of claims 43, 44, 45, 46, 47 or 49 wherein in the compound R_2 and R_3 , taken together, form an epoxide.
54. The method of any one of claims 43, 44, 45, 46, 47 or 48 wherein in the compound R_4 is hydroxyl.
55. The method of any one of claims 43, 44, 45, 46, 47, 48, 49 or 50 wherein in the compound R_5 is hydroxyl or lower alkoxy, and wherein the alkoxy substituent may be substituted or unsubstituted, linear or branched or cyclic or acyclic.
56. The method of any one of claims 43, 44, 45, 46, 47, 48, 49 or 50 wherein in the compound R_6 is lower alkyl, and wherein the alkyl substituent may be substituted or unsubstituted, linear or branched or cyclic or acyclic.

57. The method of any one of claims 43, 44, 45, 46, 47, 48, 49 or 50 wherein in the compound R₇ is hydrogen, hydroxyl, lower alkyl or lower alkoxy, and wherein the alkyl and alkoxy substitutents may be substituted or unsubstituted, linear or branched or cyclic or acyclic.
58. The method of any one of claims 43, 44, 45, 46, 47, 48, 49 or 50 wherein in the compound R₈ is hydrogen, hydroxyl or protected hydroxyl.
59. The method of any one of claims 43, 44, 45, 46, 47, 48, 49 or 50 wherein in the compound R₉ is -CHO or -CH₂OR^{vi}, wherein R^{vi} is hydrogen, protecting group or an aliphatic moiety, and wherein the aliphatic moiety may be substituted or unsubstituted, linear or branched or cyclic or acyclic.
60. The method of any one of claims 43, 44, 45, 46, 47, 48 or 49 wherein in the compound R₁₀ is hydroxyl.
61. The method of any one of claims 43, 44, 45, 46, 47, 48, 49 or 50 wherein in the compound R₁₁ and R₁₂ are independently hydrogen or lower alkoxy, and wherein the alkoxy substituent may be substituted or unsubstituted, branched or unbranched or cyclic or acyclic.
62. The method of any one of claims 43, 44, 45, 46, 48 or 49 wherein in the compound R₁₃ and R₁₄ are independently hydrogen, lower alkyl or aryl, wherein the alkyl substituent may be substituted or unsubstituted, branched or unbranched or cyclic or acyclic, and wherein the aryl substituent may be substituted or unsubstituted.
63. The method of claim 47 or 50 wherein in the compound R₁₃ is lower alkyl, and wherein the alkyl substituent may be substituted or unsubstituted, linear or branched or cyclic or acyclic.
64. The method of claim 50 wherein in the compound R₁ is hydrogen or lower alkyl, R₅ is hydroxyl or lower alkoxy, R₆ is lower alkyl, R₇ is hydrogen, hydroxyl, lower alkyl or lower alkoxy, R₈ is hydrogen, hydroxyl or protected hydroxyl, R₉ is -CHO or -CH₂OR^{vi}, R₁₁ and R₁₂ are independently hydrogen or lower alkoxy, and R₁₃ is lower

alkyl; wherein R^{vi} is hydrogen, protecting group or an aliphatic or heteroaliphatic moiety;

whereby each of the foregoing alkyl, alkoxy, aliphatic and heteroaliphatic moieties may be independently substituted or unsubstituted, linear or branched, or cyclic or acyclic.